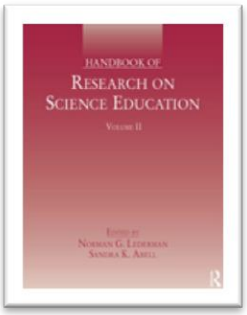

Excerpt from Chapter 28:

The History of Science Curriculum Reform in the United States

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There have been several recognizable periods of science curriculum reform in the United States since the middle of the 19th century. The first were the efforts by mid- to late 19th-century scientists to increase the intellectual rigor of science study by placing students in direct contact with natural phenomena and having them reason through the patterns and relationships they observed instead of learning by book study alone, often through rote memorization of what they read. These efforts culminated in the 1893 report of the Committee of Ten of the National Educational Association, chaired by chemist and Harvard President Charles Eliot. That was followed by a long period of Progressive-Era reforms, which lasted most of the first half of the 20th century. Then came the period of National Science Foundation (NSF) funded curriculum projects of the 1950s and 1960s, which lasted a much shorter time but whose effects are still being felt today. Then, in reaction to the highly discipline-focused and intellectually rigorous curriculum materials of the 1950s and 1960s, there was a wave of more socially responsive materials focused on environmental awareness, personal relevance, and the relationship between science and society. And then, beginning in the early 1980s, a report by the Commission on Excellence in Education, *A Nation at Risk,* stimulated an era of standards-based reform, which we are in the midst of today.

In part, these shifts were influenced by changing values in the broader society, and what was thought of as important in education changed to match the new societal vision. For example, Progressive-Era reforms took place during a time of heightened social activism in the United States—first with efforts to educate and Americanize large numbers of immigrants and then to rebuild the country after the Great Depression. Similarly, the call for renewed rigor in the curriculum and the introduction of standards-based accountability was helped along by Reagan-era conservatism and broad-based societal concerns about U.S. international competiveness. Sometimes specific events and occurrences, such as the launching of the earth-orbiting satellite, *Sputnik*, by the Soviet Union, hastened the direction of change.

To some extent, shifts also occurred because reform movements often lead to excess, as promoters become uncritically zealous and the contradictions and weaknesses of the movements become evident. This was certainly the case for progressive education as it devolved by mid-20th century into an anti-intellectual life-adjustment education. And some would argue that it was true for the reforms of the 1950s and 1960s, as its highly intellectual approach focused on the content and methods of the disciplines and almost completely ignored the practical social relevance of science or the importance of student interest. This created a curriculum that proved too difficult and uninteresting for many students and too intellectually abstract for the tastes of education leaders who had come of age during a more activist time. The more socially relevant and humanistic approaches of the 1970s (environmental education, open schools, values education, science-technology-society approaches) were a brief response to that highly intellectual treatment of the curriculum in the 1960s (DeBoer, 1991; Rudolph &

Meshoulam, in press), but those humanistic approaches in turn quickly gave way to calls for a more rigorous approach to education in *A Nation at Risk* at the same time that attitudes shifted in the broader society as well.

But it is important to point out that curriculum development is not just a cyclical process. Society's values may shift between a focus on the individual and social activism,[1] and this may influence what our educational goals are, but we do find out more about how students learn, and we do develop more effective ways of engaging students with important science content. This is possible in part because of an underlying commitment to a set of educational goals that are remarkably stable even as our thinking about their relative importance and how to accomplish them shifts over time. First is the commitment to teaching students the facts and principles of the physical world so that they can understand and appreciate natural phenomena; second is for students to understand the various ways that science is done; and third is for students to develop the ability to think rationally about the physical world. Given these ongoing commitments, it is possible for educators to focus on new approaches to science teaching that lead to more meaningful engagement by students with natural phenomena and the science ideas that explain those phenomena.

This chapter provides a brief historical summary of curriculum reform in the United States from the middle of the 19th century to the present and some of the factors that influenced that development. It should be read along with the entry by J. Myron Atkin and Paul Black in the 2007 edition of this handbook.

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